DRAFT Comments on Pre-Remedial Basis of Design Technical Evaluations Work Plan Gasco Sediments Cleanup Action Dated July 13, 2017

The following are **DRAFT** EPA comments on the *Pre-Remedial Basis of Design Technical Evaluations Work Plan* (Work Plan), dated July 13, 2017 prepared by Anchor QEA, LLC on behalf of NW Natural.

EPA has the following comments related to this Section 4.2.7 and 4.2.8 of this document.

General Comments

1. **Section 4.2, Capping Demonstration Evaluation:** in addition to stability and bearing capacity evaluations, consideration should also be given to consolidation and settlement of sediments under cap loading as estimation of consolidation/settlement of capped areas is important for evaluating long term verification of cap thickness and integrity. Consolidation assessments are also important to assess the rate of time dependent strength gain in soft sediments which may influence staged placement of cap on soft sediments.

Specific Comments

2. **Section 4.2.7, Element 5 – Slope Stability, pages 29-30:** this section addresses slope stability of capped areas. However, dredging of contaminated sediment, especially at the toe of channel slopes and river banks may cause potentially unstable conditions. Therefore, consideration should also be given to stable post-dredge slopes in dredge prism design.

3. **4.2.7, Element 5 – Slope Stability, page 29, first paragraph**: in addition to global failure modes through soft silty/clayey sediments in capped areas, consideration should also be given to shallow veneer sliding through the cap materials especially in sloped cap areas.

4. **4.2.7.1, Method of Analysis (Element 5 – Slope Stability), page 30**: The reference USACE (2003) Slope Stability Engineering Manual contains recommendations for both short-term and long-term loading conditions. Please clarify which factor of safety (FoS) will be applicable to stability evaluations for the capped areas.

5. **Section 4.2.8.1, Method of Analysis (Element 6 – Bearing Capacity), pages 31-33:** A minimum required FoS of 1.5 is recommended for bearing capacity evaluations of capped areas. Please explain if a FoS of 1.5 is considered appropriate to avoid excessive settlements and potential 'mud-waving' effects in soft fine-grained sediments that could affect cap placement.

Commented [AW1]: Similar to existing comment

6. **4.2.8.1, Method of Analysis (Element 6 – Bearing Capacity), pages 33, last sentence:** this section states that "Assessment using these three lines of evidence will be used to determine the maximum cap thickness necessary to meet the bearing capacity performance standard". Please confirm if this sentence should state "maximum cap thickness allowable" instead of "maximum cap thickness necessary".

7. **4.2.8.2, Data Requirements and Data Gaps (Element 6 – Bearing Capacity), pages 33-34**: A geologic survey of shoreline conditions should be considered to identify soil/sediment conditions, significant erosion features, previous landslides, tilted vegetation, steepness of upland slopes and other visual indicators of potential slope instability that may be useful in conducting stability evaluations.